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Claim 40 (new): The communications system of claim 36 wherein the hub station including an adaptive combiner controller for receiving representations of the OFDM symbols received from each of the base stations and determining signal characteristics thereof, the processing chains each including a complex weighting device responsive to the adaptive combiner controller for applying a weighting factor to the symbols processed thereby based on the determined signal characteristics.

REMARKS

Introduction

By way of the present amendment, clarifying amendments have been made to claims 1, 4, 7, 21 and 29. Former claims 3, 6, 8-11, 20 and 22 have been cancelled without prejudice, and new claims 33 - 40 added, such that claims 1, 2, 4, 5, 7, 12-19, 21 and 23 - 40 are currently pending. The total number of independent and dependent claims in the application remains the same.

It is noted that the examiner has indicated that claim 32 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Claim Rejections - 35 USC 112

The Examiner rejected original claim 6 under 35 U.S.C. 112. Such claim has been cancelled.

Claim Rejections - 35 USC 102

The Examiner has rejected claims 1-3, 5, 7-8, 12-13, and 20-25 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,038,450 to Brink et al. Reconsideration and withdrawal of these rejections is respectfully requested in view of the amended claims and for the reasons noted below.

Of the claims rejected as being anticipated by Brink, claims 1, 12, 21, and 23 are independent claims. Independent claim 1 has been amended herein to clarify that the wireless transmitter of the claimed communications system transmits a data signal as successive OFDM symbols using multiple sub-carriers, and that the hub station receives and combines the multiple sub-carrier data signals from the plurality of base stations to form successive received OFDM symbols, the hub station including an OFDM demodulator for demodulating the received OFDM symbols. Independent method claim 21 has been amended to clarify that it pertains to a method including: (a) receiving at a plurality of base stations OFDM symbols

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transmitted from a mobile wireless transmitter using multiple sub-carriers, and relaying the received OFDM symbols from the plurality of base stations to a hub station; and (b) receiving and combining at the hub station the received OFDM symbols from the plurality of base stations.

Thus, all of the independent claims (namely claims 1 and 21, which have both been currently amended and claims 12 and 23 which remain as originally filed) now include limitations requiring that OFDM symbols received at multiple base stations from a transmitter are then relayed from the base stations to the hub for subsequent demodulation. Such a configuration allows for receive diversity from the perspective of the hub, and eliminates the need for OFDM demodulation circuitry at each of the base stations. It is submitted that such a configuration is not apparent from the cited reference Brink.

In the cited reference Brink, OFDM receiver circuitry of Figure 3 of Brink is clearly and explicitly described as being located at the mobile units 22 and base stations 16 (see for example Brink column 5, line 60 to column 6, line 3). The Examiner appears to have inferred that lines 14-19 of column 6 and lines 28-30 of

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column 8 describe locating the OFDM receiver circuitry at the central hub station; however, it is respectfully submitted such an inference is in no way readily apparent from a reading of Brink. Lines 14-19 of column 6 disclose that in certain embodiments in the uplink, the base stations 16a-c "collect" the received signals from the mobile unit 22 and send the received signals to the MSC 18 where the received signals are combined. It should be noted, however, that Brink does not specifically state that it is OFDM signals that are relayed from the hub stations to the MSC 18, or that MSC 18 includes OFDM demodulation circuitry. With respect to lines 28-30 of column 8 of Brink, such lines indicate that in the context of multiple sub-carrier CDMA, after appropriate processing by the circuitry of Figure 3, the multiple sub-carrier symbol is output to the destination or user. It will be noted, however, that in such context Brink is referring to a multiple sub-carrier CDMA symbol, rather than an OFDM symbol. Indeed, when Brink discusses the circuit of Figure 3 in the context of OFDM symbols, the circuit is described as an OFDM receiver circuitry (see for example Brink, column 5, line 60 to column 6, line 3), which includes common OFDM demodulating components such as a DFT and parallel to serial converter. Thus, the symbols output from the circuitry of Figure 3 for sending to a destination are not "OFDM" symbols.

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Accordingly, it is submitted that in the context of OFDM symbols, Brink clearly discloses embodiments in which OFDM symbols are demodulated at the each of the base stations, rather than at a central station, and Brink does not teach or suggest such a configuration such as is presently claimed. In fact, in view of the clear disclosure in Brink on locating the OFDM demodulation circuitry at the base stations, it is submitted that Brink teaches away from demodulating the OFDM symbols at a central hub.

It is submitted that the remaining dependent claims in the application that had been rejected by the Examiner as being anticipated by Brink are also directed to novel subject matter as, among other things, they each depend from independent claims that are directed to novel subject matter for the reasons stated above.

Claim Rejections - 35 USC 103

The Examiner has rejected a number of the claims in the application, including claims 4, 6 (now cancelled), 9-11 (now cancelled), 14-16, 17-19, and 26-31 as being directed to subject matter that is unpatentable over Brink et al in view of various other references. For the reasons stated above, it is submitted

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that all of the independent claims currently pending in the application are directed to non-obvious subject matter, as are the claims that depend therefrom, and accordingly, reconsideration and withdrawal of the obviousness rejections is requested. It is further submitted that a number of the dependent claims include further features that add additional patentable subject matter and some of these claims will now be discussed in the context of the specific objections raised by the Examiner.

The Examiner has rejected claim 4 as being unpatentable over U.S. Patent No. 6,038,450 to Brink et al in view of U.S. Patent No. 5,568, 205 to Hurwitz. In addition to previously stated reasons, reconsideration and withdrawal of such rejection is requested for the following reasons. Amended dependent claim 4 adds the further limitation to claim 1 that the communications system is used as a mobile electronic news gathering system, including a video camera and audio transducer coupled to the wireless transmitter. Such a system can provide for robust, economical, high data rate wireless transfer required for mobile electronic news gathering. It will be noted that Brink does not disclose or suggest that mobile units be electronic news gathering units. In the described embodiment in Brink, the only example identified for network 20 to which the MSC

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18 is connected is a PSTN, which traditionally will not provide the required bandwidth for the audio and video used in mobile electronic news gathering. Hurwitz discloses a camera mounted wireless audio/video transmitter system in which the camera transmits signals at about a range of 100 yards (see Hurwitz, column 6, lines 27-38) to either a video receiver, a video recorder, or a receiver in a van 80, which can retransmit the signals to a station using "direct microwave, one or more land based microwave hops, or by bouncing the microwave signal through a satellite." (See Hurwitz, column 8, lines 54-58). However, Hurwitz does not include any suggestion of using the camera system in a multiple base station OFDM environment, and does not indicate any need for using a plurality of base stations to transmit symbols to a hub. As such, it is submitted that there is no motivation provided within the cited references to arrive at the presently claimed solution, and accordingly claim 4 is directed to patentable subject matter.

The Examiner has rejected claims 27-28 as being unpatentable over U.S. Patent 6,038,450 to Brink et al. In addition to previously stated reasons, reconsideration and withdrawal of such rejection is requested for the following reasons. Claim 27 includes the

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limitation that the hub station is configured to perform a separate discrete Fourier transform (DFT) on the OFDM symbols received from at least some of the different base stations, and combine the transformed signals based on measured signal characteristics. It is respectfully submitted that such a feature is not suggested by the cited reference. Figure 3 of Brink discloses a receiver circuitry having a single DFT - thus, the DFT is not being performed on separately on the received OFDM symbols (compare with Figures 6 and 7 of the present application which illustrate embodiments of a hub station configured to perform a separate DFT on the symbols from each of the base stations). Thus, the claimed invention cannot be achieved simply by moving the base station circuitry of Figure 3 of Brink to the MSC of Brink.

The Examiner has rejected claims 19 and 29-30 as being unpatentable over U.S. Patent 6,038,450 to Brink et al. in view of U.S. Patent Application Publication 2002/0027957 to Paulraj. In addition to previously stated reasons, reconsideration and withdrawal of such rejection is requested for the following reasons. Dependent claims 19 and 29 each add the further limitation in which the hub station 22 is configured to determine which base stations 14 have received a transmission from the wireless transmitter 18 by checking for the

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presence of training symbols. It is noted that Paulraj specifically discusses processing of training symbols at the base stations, not at a hub station. Brink et al provides no guidance at all on processing of multiple OFDM signals received at a hub station. Thus, there is no motivation or suggestion in the cited references for arriving at a system in which a hub station determines which base stations 14 have received a transmission from the wireless transmitter based on the presence of training symbols, and accordingly claim 4 is directed to patentable subject matter.

The Examiner has rejected claim 31 as being unpatentable over U.S. Patent 6,038,450 to Brink et al. in view of U.S. Patent Application Publication 2002/0027957 to Paulraj and in further view of U.S. Patent Application Publication No. 2003/0195017 to Chen et al. In addition to previously stated reasons, reconsideration and withdrawal of such rejection is requested for the following reasons. As previously stated above, Brink et al offers no guidance on processing OFDM signals at a hub, and accordingly, there is no motivation to combine the three references to arrive at the claimed solution.

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New claims

New claim 33, which depends directly from independent claim 23, combines limitations from dependent claims 25 and 32. New claim 34 is similar to new claim 33, but depends from independent claim 12 instead of independent claim 23. It is noted that the Examiner has indicated that claim 32 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 33 and 34 do not include all the limitations all of the intervening claims from which claim 32 depended; however, it is submitted that claims 33 and 34 are directed to similar features as claim 32 and accordingly should also be allowable.

New dependent claims 35-40 add further novel features about the hub station configuration, and are supported by Figures 5-7 and the related description of such Figures in the application as originally filed.


It is respectfully submitted that the present claims are directed to patentable subject matter and are in condition for allowance, which is earnestly solicited.

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Applicants hereby request an extension of time for two(2) months through December 28, 2004, in order to timely file this amendment. A check in the amount of \$225.00 is attached herewith for the extension fee. Please charge Deposit Account No. 19-2105 for any additional fees required to be paid in connection with this submission.

Respectfully submitted,



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